

ABSTRACT OF THE DISCLOSURE

Multi-stage abatement systems and methods of use to remove final traces of pollutants and hazardous substances such as fluorinated species from effluents generated by semiconductor manufacturing operations. The effluent is treated in a main abatement tool, in combination with a secondary polishing scrubber that utilizes a high efficiency abatement technique to remove the final traces of pollutants from the effluent gas. The polishing scrubber can utilize treatment units such as high retention time scrubber vessels, recirculating post scrubber beds, dry post scrubbers, catalytic systems for OF₂ abatement, and/or UV radiation systems for OF₂ abatement.